Missouri Streams Fact Sheet

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How does a watershed work?

Watersheds and streams are dynamic and complex systems. Watersheds are composed of any area of land that collects water: hills, gullies, floodplains, riparian corridors and streams. Important watershed functions can be changed by altering the four primary components that drive stream systems: water, sediment, stream power and vegetation. Since all of the parts of a watershed are interconnected, changes made in any one part of the watershed can cause changes in other parts, but these changes may take place over many years or affect long distances.

To effectively understand and manage a watershed and its parts, it is important to see how the parts work together with one another. To do this, many different types of knowledge in many fields of science is necessary including biology, geomorphology, hydrology, hydraulics, soil science, forestry, agriculture, engineering, sociology and others. Therefore, in order to work with, in and around the world's watersheds, it takes the support of many experts, well-informed land managers and decision-makers to keep them working naturally.

What is a stream?

A *stream* is a body of water that flows in a channel on the surface of the earth. The amount of water flowing in a stream varies with storms and seasons both wet and dry. In fact, some streams only have flowing water during and shortly after storms, while other streams have flowing water all year round. The power created by the flowing water in a stream carries soil particles, sand and rocks, moving them downstream. These soil particles, sand and rocks in the stream are called *sediments* (Figure 1). The shape, roughness and steepness of the channel also play a part by

Figure 1

determining *how much* stream power is available to erode the earth. The physical conditions of a natural stream can change from day to day and year to year as flow varies and as water shapes the channel. These frequent changes help to make streams biologically diverse systems.

A stream is much more than water and sediment flowing in a channel, though. To fully understand a stream it is necessary to look beyond the channel, because a stream is a product of all of its parts: uplands, *floodplain*, *riparian corridor* and *stream channel*. All of these features of a stream must be understood, because a stream is only as healthy as the land that surrounds it—its watershed.

Importance of Watersheds

Watersheds are the keys to stream health. A stream is a reflection of the physical, chemical and biological components of its watershed. Everything that happens in a watershed affects its streams. How the land and water are used in areas that are not even close to the stream will affect water quality, and temperature, streamflow, stream habitat and aquatic communities. Everyone lives in a watershed, therefore everyone affects the health of streams every day.

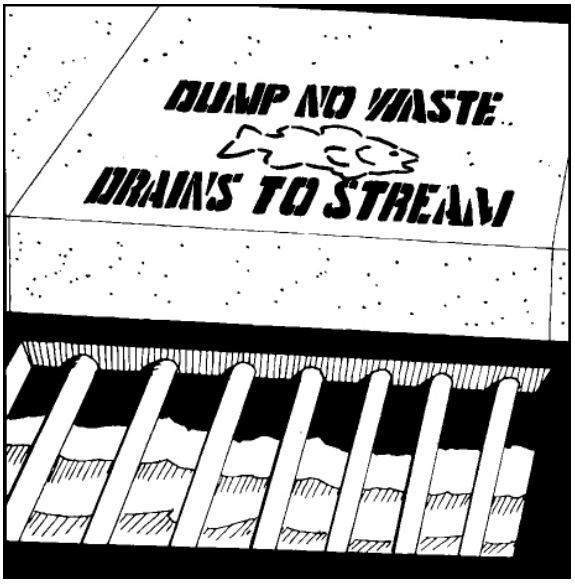

Figure 2

Healthy Streams and Watersheds

Good stream habitat, including the quality of the water, is needed to maintain diverse aquatic and riparian communities. Protecting stream habitat directly protects stream life. A healthy stream supports a wide variety of organisms in the food web. Any changes in a stream system that cause long-term stream instability usually result in reduced habitat diversity in and out of the water. These reductions include the destruction of spawning habitat for fish, a loss of attachment sites where invertebrates collect their food and less cover in the stream for invertebrates, fish, turtles and other aquatic life.

Stable streams are streams in balance with water, sediment, power and vegetative conditions. These balanced streams, when combined with good management of uplands, floodplain, riparian corridor and stream channel, provide the most diverse habitat for aquatic life. Activities in a watershed that change streamflow, sediment supply, physical habitat, water quality or food abundance are usually harmful to stream communities. These activities may include dumping trash, chemical application, land clearing, increased *impervious surfaces* and many others (Figure 2). The correction of these activities and the overall protection of Missouri streams are easiest when watershed problems are quickly recognized and solved before they get out of hand.

Maintaining Missouri's Healthy Streams

The health of Missouri streams is influenced directly or indirectly by many factors and the abundance and distribution of aquatic life and habitat rest upon the health of streams. Therefore, effective, long-term management must address every aspect of the stream. When managing streams, the focus cannot be on one species or one site. The entire stream system must be considered: watersheds, floodplains, riparian corridors and stream channels.

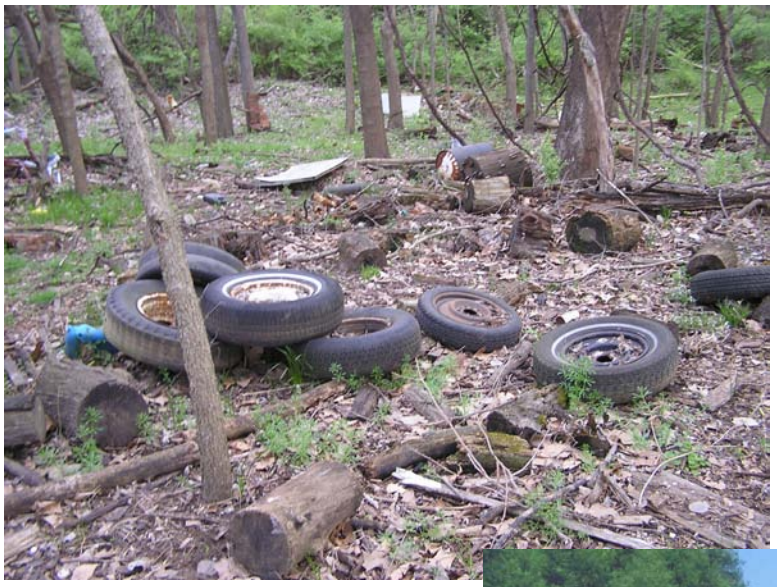

Figure 3

One must also consider the diverse needs and interests of humans within a watershed. Humans can be the key to maintaining and protecting the watershed, but they are also the biggest threat to stream health (Figures 3 & 4). The needs of a natural stream and human life must be balanced through educated management so that the health of Missouri streams is not taken for granted.

Figure 4

Patience and persistence is very important when it comes to protecting and improving Missouri streams and watersheds. Improvements in watersheds can take many years, but with the determination of Missouri citizens, the health of its streams can be maintained or improved.

Here are some ways you can help manage *your* watershed:

- Learn more about your watershed and how it works.
- Write or help write a watershed plan.
- Adopt a stream or volunteer to help other watershed groups.
- Encourage your community to look at "smart growth" opportunities.

The following books provide more information on understanding streams and watersheds:

A View of the River by Luna B. Leopold, 1994. Harvard University Press, Cambridge, Massachusetts.

Applied River Morphology by Dave Rosgen, 1996, Wildland Hydrology, Pagosa Springs, Colorado.

Better Trout Habitat: A Guide To Stream Restoration and Management by Christopher J. Hunter, 1991, Island Press, Washington D.C.

California Rivers and Streams: The Conflict Between Fluvial Process and Land Use by Jeffrey F. Mount, 1995, University of California Press, Berkeley and Los Angeles, California.

Streamkeeper's Field Guide by Tom Murdoch and Martha Cheo with Kate O'Laughlin, 1996 Adopt-A-Stream Foundation, Everett, Washington

Water, Rivers and Creeks by Luna B. Leopold, 1997, University Science Books, Sausalito, California.